

IN THE UNITED STATES PATENT AND TRADE MARK OFFICE

APPLICANT: Shinsuke MATSUMOTO et al CONF.: 8186

SERIAL NO.: 10/577,557 GROUP: 1796

FILED: April 28, 2006 EXAMINER: Melissa A. Winkler

FOR: FLEXIBLE POLYURETHANE FOAM AND USE THEREOF

DECLARATION

I, Atsushi Miyata, declare and state that:

1. In March 2003, I was graduated from Graduate School of Agriculture, Kyoto University.

2. In April 1, 2003, I joined Mitsui Chemicals Inc. Since then, I have been engaging in development of polyurethane foams and polyols for polyurethane foams.

3. I am familiar with the invention described in the specification of the above-identified Application.

4. The following experimentation was conducted under my supervision. Details of the experimentation are described below.

5. Experimentation

(1) Experimentation 1

100 parts by weight of polyol (Polyol C) having an OHV (hydroxyl value) of 35 mg KOH/g and a total unsaturation degree of 0.018 meq./g that is produced by adding PO (propylene oxide) to glycerin in the presence of CsOH catalyst and then followed by EO capping (15 wt%), and 1 part by weight of polyol (Polyol M) having an OHV of 550 mg KOH/g and an amine value of 413 mg KOH/g, produced by adding PO to methyliminobispropylamine were mixed at an

amount equivalent to the NCO index of 1.00 with Cosmonate TM-20 (product from Mitsui Chemicals, Inc.) that is a mixture of 80 parts of a mixed 2,4-toluylene diisocyanate and 2,6-toluylene diisocyanate in a mass ratio of 80:20, and 20 parts of polymethylene polyphenyl polyisocyanate, and the mixture was stirred by a spatula for 90 seconds and then viscosity of the mixture was measured with a digital viscometer DVH-B-4II (product from Toki Sangyo Co. Ltd.) every one minute.

Measurement results of viscosity are shown in Table 1 and Figure 1 below.

The relation of measurement time and viscosity at measurement results meets the following approximate formula;

$$\text{Viscosity (mPa} \cdot \text{s)} = 10^{(At + D)}$$

wherein t is a measurement time, A is a coefficient and D is the viscosity at time of zero.

A is defined as a coefficient of viscosity increase. Further B which is a value derived by dividing A with the mol number of Polyol M is defined as a coefficient of viscosity increase per mol of amine-containing polyol.

In Experimentation 1, coefficient A was determined as 0.0851. As mol number of Polyol M was 0.00268, coefficient B that is coefficient of viscosity increase per mol of amine-containing polyol was determined as 31.8.

## (2) Experimentation 2

The coefficient B was measured in the similar manner as in Experimentation 1 except that polyol (Polyol N) having an OHV of 345 mg KOH/g and an amine value of 115 mg KOH/g, produced by adding PO to triethanolamine was used instead of Polyol M.

Measurement results of viscosity are shown in Table 1 and Figure 1 below.

In Experimentation 2, coefficient A was determined as 0.0032. As mol number of Polyol N was 0.00200, coefficient B was determined as 1.6.

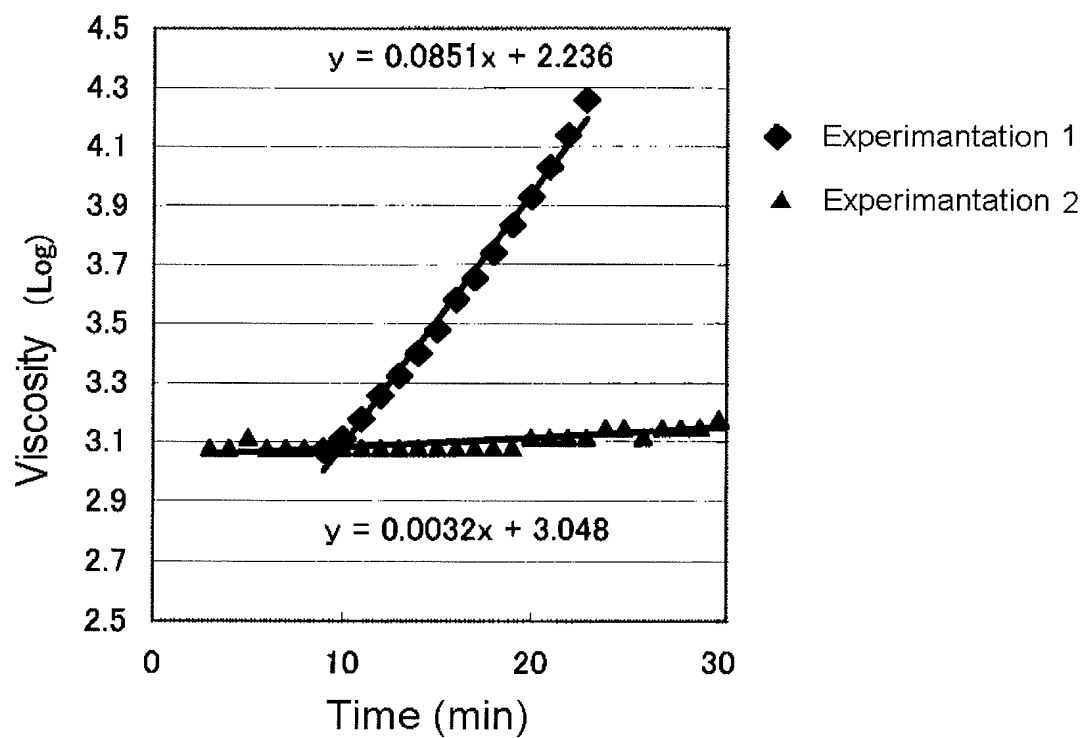
## (3) Conclusion

The comparison of Experimentation 1 and Experimentation 2 shows that methyliminobispropylamine has much higher reactivity by approximately twenty times than triethanolamine.

Table 1

Time (min)	Viscosity (Log) (mPa · s)		Time (min)	Viscosity (Log) (mPa · s)	
	Exper.1	Exper.2		Exper.1	Exper.2
3	-	3.08	17	3.65	3.08
4	-	3.08	18	3.74	3.08
5	-	3.11	19	3.83	3.08
6	-	3.08	20	3.92	3.11
7	-	3.08	21	4.03	3.11
8	-	3.08	22	4.14	3.11
9	3.07	3.08	23	4.25	3.11
10	3.11	3.08	24	-	3.15
11	3.18	3.08	25	-	3.15
12	3.26	3.08	26	-	3.11
13	3.32	3.08	27	-	3.15
14	3.40	3.08	28	-	3.15
15	3.48	3.08	29	-	3.15
16	3.58	3.08	30	-	3.18

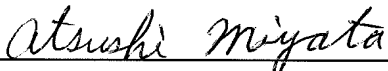
Fig. 1



The undersigned declares further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United Code and that such willful false statements may jeopardize the validity of the application or any patent using thereon.

Respectfully submitted,

this 4th day of September, 2009

  
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Atsushi Miyata